

WHAT IS CLAIMED IS:

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1. An optical transmitter comprising:

an amplitude modulation unit performing amplitude modulation of only a one-side amplitude of a main signal with a low-frequency signal having a predetermined frequency;

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an optical modulator receiving an input signal generated by the amplitude modulation unit after the one-side amplitude modulation, and modulating an incoming light in response to the received signal in accordance with a predetermined modulation-characteristic curve to output an optical output signal; and

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an operating point control unit applying a predetermined bias voltage to the optical modulator to control a level of the input signal substantially applied to the modulation-characteristic curve so that the one-side amplitude of the main signal is applied to a minimum portion of the modulation-characteristic curve of the optical modulator.

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2. The optical transmitter of claim 1 wherein the amplitude modulation unit is provided to superimpose a signal, having the predetermined frequency in phase or 180 degrees out of phase with the low-frequency signal, on the input signal generated after the one-side amplitude modulation, so that an opposite-side amplitude of the main signal is canceled.

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3. The optical transmitter of claim 1 wherein the amplitude modulation unit is provided to perform amplitude modulation of only a valley portion in a waveform of the input signal when the

input signal to the optical modulator is applied to an upward slope portion of the modulation-characteristic curve, and perform amplitude modulation of only a peak portion in the waveform of the input signal when the input signal to the optical modulator is applied to a downward slope portion of the modulation-characteristic curve.

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4. An optical transmitter comprising:

an amplitude modulation unit performing amplitude modulation of a main signal with a low-frequency signal having a predetermined frequency;

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an optical modulator receiving an input signal generated by the amplitude modulation unit after the amplitude modulation, and modulating an incoming light in response to the received signal in accordance with a predetermined modulation-characteristic curve to output an optical output signal; and

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an operating point control unit applying a predetermined bias voltage to the optical modulator to control a level of the input signal substantially applied to the modulation-characteristic curve of the optical modulator, so that the input signal generated after the amplitude modulation is applied to a minimum portion of the modulation-characteristic curve when the main signal is in OFF state.

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5. The optical transmitter of claim 1 or 4 wherein the operating point control unit comprises a phase comparator which compares a phase of the optical output signal of the optical modulator with a phase of the low-frequency signal, and the bias voltage applied to the optical modulator by the operating point control unit is changed to a different polarity depending on whether the two signals are in phase or 180 degrees out of phase.

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6. The optical transmitter of claim 1 or 4 wherein the optical transmitter comprises a Mach-Zehnder optical modulator.

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7. A control method of an optical transmitter provided with an optical modulator, comprising:

10 performing amplitude modulation of only a one-side amplitude of a main signal with a low-frequency signal having a predetermined frequency;

causing the optical modulator to receive an input signal generated after the one-side amplitude modulation, and modulate an incoming light in response to the received signal in  
15 accordance with a predetermined modulation-characteristic curve to output an optical output signal; and

applying a predetermined bias voltage to the optical modulator to control a level of the input signal substantially applied to the modulation-characteristic curve so that the one-  
20 side amplitude of the main signal is applied to a minimum portion of the modulation-characteristic curve of the optical modulator.

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8. The control method of claim 7 wherein the amplitude modulation is provided to superimpose a signal, having the predetermined frequency in phase or 180 degrees out of phase  
30 with the low-frequency signal, on the input signal generated after the one-side amplitude modulation, so that an opposite-side amplitude of the main signal is canceled.

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9. The control method of claim 7 wherein the amplitude

modulation is provided to perform amplitude modulation of only a valley portion in a waveform of the input signal when the input signal to the optical modulator is applied to an upward slope portion of the modulation-characteristic curve, and  
5 perform amplitude modulation of only a peak portion in the waveform of the input signal when the input signal to the optical modulator is applied to a downward slope portion of the modulation-characteristic curve.

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10. A control method of an optical transmitter provided with an optical modulator, comprising:

15 performing amplitude modulation of a main signal with a low-frequency signal having a predetermined frequency;

causing the optical modulator to receive an input signal generated after the amplitude modulation, and modulate an incoming light in response to the received signal in accordance with a predetermined modulation-characteristic curve to output  
20 an optical output signal; and

applying a predetermined bias voltage to the optical modulator to control a level of the input signal substantially applied to the modulation-characteristic curve of the optical  
25 modulator, so that the input signal generated after the amplitude modulation is applied to a minimum portion of the modulation-characteristic curve when the main signal is in OFF state.

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11. The control method of claim 7 or 10 wherein the optical transmitter comprises a phase comparator which compares a phase of the optical output signal of the optical  
35 modulator with a phase of the low-frequency signal, and the bias voltage applied to the optical modulator is changed to a different polarity depending on whether the two signals are in

phase or 180 degrees out of phase.

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12. The control method of claim 7 or 10 wherein the optical transmitter comprises a Mach-Zehnder optical modulator.

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